

12-2 What Blood Types Can Be Mixed?

Sometimes patients may lose a lot of blood. In these cases blood from another person can be given to the patient. This giving of someone else's blood to a person is called a transfusion.

There are four main blood types: A, B, AB, and O. Only certain blood types can be mixed when a transfusion is made. Mixing blood types incorrectly during a transfusion can lead to serious illness or the death of a patient.

INVESTIGATION

OBJECTIVES

In this exercise, you will:

- set up plastic cups filled with water and food coloring to represent the four blood types.
- mix "blood" to see if color changes take place.
- judge which blood types can be mixed safely.

KEYWORDS

Define the following keywords:

blood type _____

donor _____

recipient _____

MATERIALS

colored pencils: red, green, and black
food coloring: red and green
graduated cylinder

20 small clear plastic cups
6 droppers

PROCEDURE

Part A. Set Up

- Turn over the page and examine the grid in Figure 2. Note the columns marked *Recipient* and the rows marked *Donor*.
- Place one of the small plastic cups onto each of the 20 squares as shown here in Figure 1.
- Fill each cup with 10 mL of water.
- Using a dropper, add 4 drops of red food coloring to each of the four cups in the column marked *Recipient A* (red), and to the cup marked *Donor A*.





















Donor	Recipient			
	A	B	AB	O
				
				
				
				

FIGURE 1. Placing cups on grid

- Using a different dropper, add 2 drops of green food coloring to the four cups in the column marked *Recipient B* (green), and to the cup marked *Donor B*.
- Add 3 drops of red food coloring and 3 drops of green food coloring to each of the four cups in the column marked *Recipient AB* (red and green), and to the cup marked *Donor AB*.
- Note that the four cups in the column marked *Recipient O*, and the one cup marked *Donor O* have no food coloring added to them.
- Using colored pencils, color in Table 1 to show the colors of all 16 cups marked *Recipient*.

Table 1. Before Blood Is Mixed

Donor	Recipient			
	A	B	AB	O
A				
B				
AB				
O				

Part B. Mixing Blood Types

- Using a clean dropper, remove "blood" from the cup marked *Donor A*. Moving across the grid, add 2 droppers full of Type A "blood" to each of the four cups in the same row. This step shows what happens when a donor gives his or her blood to a recipient.
- Repeat step 1 for the next row, but this time use "blood" from the cup marked *Donor B*.
- Repeat step 1 for the next row, but this time use "blood" from the cup marked *Donor AB*.
- Repeat step 1 for the final row, but this time use "blood" from the cup marked *Donor O*.
- Color in Table 2 to show the colors of all 16 recipient cups.

Table 2. After Blood Is Mixed

Donor	Recipient			
	A	B	AB	O
A				
B				
AB				
O				

Name _____ Class _____ Period _____

FIGURE 2. Grid for mixing food colors

Donor	Recipient			
	A	B	AB	O
A (red)	(red)	(green)	(red + green)	(clear)
B (green)	(red)	(green)	(red + green)	(clear)
AB (red + green)	(red)	(green)	(red + green)	(clear)
O (clear)	(red)	(green)	(red + green)	(clear)

Part C. Judging If Blood Is Safe to Mix

1. Compare Tables 1 and 2. Blood is *safe* to mix between donor and recipient if there is *no change in color* in the same cup from Table 1 to Table 2. Blood is *not safe* to mix between donor and recipient if there is *a change in color* in the same cup from Table 1 to Table 2.
2. Complete Table 3. Write the word *safe* or *unsafe* in each of the 16 squares.

Table 3. Is Blood Safe To Mix?

Donor	Recipient			
	A	B	AB	O
A				
B				
AB				
O				

QUESTIONS

1. List the blood types of people to which a Type A donor can safely donate blood. _____
2. List the blood types of people to which a Type B donor can safely donate blood. _____
3. List the blood types of people to which a Type AB donor can safely donate blood. _____
4. List the blood types of people to which a Type O donor can safely donate blood. _____
5. List the blood types of people from which a Type AB recipient can receive blood. _____
6. A person with Type O blood is often called a "universal donor." Why might this be a good term to use to describe such a person? _____

7. A person with Type AB blood is often called a "universal recipient." Why might this be a good term to use to describe such a person? _____
